3GPP TSG RAN Meeting #71 **RP-160636**
Gothenburg, Sweden, March 7 - 10, 2016

Source: **ZTE, Intel, China Telecom, Samsung**
Title: **New WID: Further mobility enhancements in LTE**
Document for: **Approval**
Agenda Item: **14.1.1**

3GPP™ Work Item Description

For guidance, see 3GPP Working Procedures, article 39; and 3GPP TR 21.900.
Comprehensive instructions can be found at http://www.3gpp.org/Work-Items

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Title:

Acronym: LTE_eMob

Unique identifier:

NOTE: If this is a RAN WID including Core and Perf. part, then Title, Acronym and Unique identifier refer to the feature WI. Please tick (X) the applicable box(es) in the table below:

This WID includes a Core part	
This WID includes a Performance part	

1 3GPP Work Area

X	**Radio Access**
	Core Network
	Services

2 Classification of WI and linked work items

2.0 Primary classification

This work item is a …

	Study Item (go to 2.1)
	Feature (go to 2.2)
	Building Block (go to 2.3)
X	**Work Task (go to 2.4)**

NOTE: Core, Performance and Testing parts of RAN WIs are usually Building Blocks.
If you are in doubt, please contact MCC.

2.1 Study Item

Related Work Item(s) (if any]		
Unique ID	Title	Nature of relationship

Go to §3.

2.2 Feature

Related Study Item or Feature (if any)		
Unique ID	Title	Nature of relationship

Go to §3.

2.3 Building Block

Parent Feature (or Study Item)		
Unique ID	Title	TS

This work item is …

	Stage 1 (go to 2.3.1)
	Stage 2 (go to 2.3.2)
	Stage 3 (go to 2.3.3)
	Test spec (go to 2.3.4)
	Other (go to 2.3.5)

2.3.1 Stage 1

Source of external requirements (if any)		
Organization	Document	Remarks

Go to §3.

2.3.2 Stage 2

Corresponding stage 1 work item		
Unique ID	Title	TS

Other source of stage 1 information		
TS or CR(s)	**Clause**	**Remarks**

If no identified source of stage 1 information, justify:

Go to §3.

2.3.3 Stage 3

Corresponding stage 2 work item (if any)		
Unique ID	**Title**	**TS**

Else, corresponding stage 1 work item		
Unique ID	**Title**	**TS**

Other justification		
TS or CR(s) or external document	**Clause**	**Remarks**

If no identified source of stage 2 information, justify:

Go to §3.

2.3.4 Test spec

Related Work Item(s)		
Unique ID	**Title**	**TS**

Go to §3.

2.3.5 Other

Related Work Item(s)			
Unique ID	**Title**	**Nature of relationship**	**TS / TR**

Go to §3.

2.4 Work task

Parent Building Block		
Unique ID	**Title**	**TS**

3 Justification

With the recent blooming of mobile broadband, higher demand on network capacity is expected in the future. In addition, high user throughput is expected by smart phone users in order to access more data demanding applications. One of the technology directions to meet these requirements is to deploy small cells more densely than before.

Mobility performance is one of the most important aspects for wireless communications. There are already several completed SI/WIs addressing the mobility improvements (e.g. Hetnet mobility, dual connectivity), one of the key aspects of mobility, service interruption, was also studied. Service interruption, which occurs during handover (change of PCell) or dual connectivity SCG Change (change of PSCell) and lasts at least several tens of milliseconds, may have significant impact on user experiences, in particular, for latency sensitive services. Service interruption during handover also has impact on TCP performance as large interruption time can trigger congestion avoidance algorithm and TCP data rate can be reduced dramatically even after the link is resumed after mobility. Such service interruption is mainly due to mobility events (e.g. handover, SCG change) related reconfiguration (including associated UE processing time) of physical layer and layer 2/3, and RACH procedure towards target eNB/SeNB, for both ideal and non-ideal backhaul scenarios. In dense network deployment scenarios, mobility events are more frequent, therefore minimization of service interruption and handover related network signalling are essential to achieve the intended high area traffic capacity. With advanced MIMO capabilities at both eNB and UE, cooperative multi-site/multi-beam operation and flexible transmission and reception point switching would be natural candidate solutions to support seam-less mobility with less interruption. Moreover, based on the current Dual-connectivity framework, the transmission of control plane signalling is still restricted in MeNB, even in case the UE is at the edge of the macro cell but has good coverage from SeNB. With this restriction, the RRC signalling for mobility can only be transmitted through the macro cell, which may cause some unnecessary HO failure. As a potential optimisation, RRC diversity has been studied in the SI phase of Dual connectivity and a considerable gain can be obtained from RRC diversity in the TR 36.842. However, due to the limited time budget, the RRC diversity has not been discussed sufficiently and be removed in the WI phase. In order to improve the mobility robustness, it is desirable to continue the study on usage and solutions for RRC diversity based on the framework of dual connectivity. In addition to the scenario discussed above, further enhancements to mobility robustness in both heterogeneous and homogeneous dense deployment can be studied to improve user experience.

Taking into account the above aspects, further enhancement to mobility are necessary.

4 Objective

4.1 Objective of SI or Core part WI or Testing part WI

The main objectives of this work item are to do the following enhancements:

- To study following aspects ~~evaluate~~ and specified identified~~y~~ solution(s) to minimize service interruption in mobility events for both ideal and non-ideal backhaul scenarios, including [RAN2/RAN3]:
    - ~~Dual connections with source eNB and target eNB temporarily i.e. m~~Make before break for mobility event ~~like~~ e.g. handover in case of DC and CA or SCG change ~~.~~
    - ~~Discuss and may~~Potencially down select between solution 1(RACH-less handover) and solution 2 (Maintaining Source eNB Connection during

Handover) in section 8.3 of TR 36.881v050~~ and specify selected solution(s) afterwards~~.

- Feasibility of simultaneous TX/RX on the same frequency is subject to RAN4.

The Work Item should consider both FDD and TDD.

4.2 Objective of Performance part WI

NOTE: Leave empty if the WI proposal does not contain a RAN performance part.

4.3 RAN time budget proposal

NOTE: For WIs/SIs under RAN WG5 leadership this section is not filled out. Otherwise: For a not yet approved WI/SI the rapporteur has to fill out the last row of the table(s) below up to the target date of the WI/SI (if necessary add further tables): Indicate the number of time units (1 TU ~ 2h), i.e. one value for each session/field. If no time unit is needed, leave the field empty.
For WI/SI already approved in the past, the tables below will no longer be updated in the WI/SI description (i.e. the tables reflect the status of the initial approval). But changes can be proposed in the status report of the WI/SI.

RAN #71 #72									**Q2/2016**									**RAN**	
R1L	R1U	R2L	R2U	R2J	R3	R4RF Core	R4RD Core	R4RF Perf	R4RD Perf	R1L	R1U	R2L	R2U	R2J	R3	R4RF Core	R4RD Core	R4RF Perf	R4RD Perf
84bis	84bis	93bis	93bis	89bis	91bis	78bis	78bis	78bis	78bis	85	85	94	94	90	92	79	79	79	79
		1			**0.5**							**1~~0.5~~**			**0.5**				

RAN #72 #73					**Q3/2016**				**RAN**
R1L	R1U	R2L	R2U	R2J	R3	R4RF Core	R4RD Core	R4RF Perf	R4RD Perf
86	86	95	95	91	93	80	80	80	80
		0.5			**0.5**	**0.5**			

RAN #73 #74									**Q4/2016**									**RAN**	
R1L	R1U	R2L	R2U	R2J	R3	R4RF Core	R4RD Core	R4RF Perf	R4RD Perf	R1L	R1U	R2L	R2U	R2J	R3	R4RF Core	R4RD Core	R4RF Perf	R4RD Perf
86bis	86bis	95bis	95bis	91bis	93bis	80bis	80bis	80bis	80bis	87	87	96	96	92	94	81	81	81	81
		1			**0.5**	**0.5**						**1**			**0.5**	**0.5**			

RAN #74 #75					**Q1/2017**				**RAN**
R1L	R1U	R2L	R2U	R2J	R3	R4RF Core	R4RD Core	R4RF Perf	R4RD Perf
88	88	97	97	89	95	82	82	82	82
		1			**0.5**				

L: LTE, U: UMTS, J: Joint, RD: RRM/demodulation

NOTE: In case further explanation of the time budget proposal is needed, then please explain this below.

additional comments to the time budget proposal:

5 Service Aspects

6 MMI-Aspects

7 Charging Aspects

8 Security Aspects

9 Impacts

Affects:	**UICC apps**	**ME**	**AN**	**CN**	**Others**
Yes		X	X		
No	X			X	X
Don't know					

10 Expected Output and Time scale

New specifications [If Study Item, one TR is anticipated]						
Spec No.	Title	1st rsp. WG	2nd rsp. WG(s)	Presented for information at plenary#	Approved at plenary #	Comments

NOTE: If this is a RAN WID including Core and Perf. part, then all new Core part specs have to be listed first and then all new Perf. part specs. Indicate "Core part" or "Perf. part" under Comments for each spec.
By default a new specs can only be new for one of both parts.

Affected existing specifications [None in the case of Study Items]				
Spec No.	CR	Subject of the CR	Approved at plenary#	Comments
36.300		Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2	RAN#74	Core part
36.306		Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio access capabilities	RAN#74	Core part
36.331		Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification	RAN#74	Core part
36.423		Evolved Universal Terrestrial Radio Access (E-UTRA); X2 application protocol (X2AP)	RAN#74	Core part
36.133		Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements for support of radio resource management	RAN#74	Core part
36.101		Evolved Universal Terrestrial Radio Access (E-UTRA); UE Radio transmission and reception	RAN#74	Core part

NOTE: If this is a RAN WID including Core and Perf. part, then all new Core part specs have to be listed first and then all new Perf. part specs. Indicate "Core part" or "Perf. part" under Comments for each spec.
If an existing spec is affected by both (Core part and Perf. part), then it has to be listed twice with appropriate approval dates.

11 Work item rapporteur(s)

DU, ZHONGDA
Company: ZTE Corporation
Email: du.zhongda@zte.com.cn

ZHANG, YUJIAN
Company: Intel Corporation
Email: yujian.zhang@intel.com

ZHU, Jianchi
Company: China Telecom
Email:zhujc@ctbri.com.cn

Alexander Sayenko
Company: Samsung
Email: alex.sayenko@samsung.com

12 Work item leadership

Leading working group:
RAN2 working group

Secondary working group:
RAN3 working group
RAN4 working group

NOTE: If this is a RAN WID including Core and Perf. part, then this WG specifies the WG leading the Core part.
RAN WG4 is by default leading the Perf. part.

13 Supporting Individual Members

Supporting IM name
CEWiT
CATR
China Mobile
China Telecom
China Unicom
IAESI
IITH
Intel Corporation
ITL
KT Corporation
Mediatek
Reliance – Jio
Samsung
WILUS Inc
ZTE
OPPO
ASTRI
Nubia technology
Shanghai Tejet Com Technology
Verizon
SK Telecom
LG Uplus
ETRI
Nokia Networks